



NAVAL
POSTGRADUATE
SCHOOL

TwiddleNet

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Twiddle

...to fiddle with something; be bored or idle

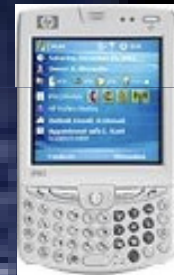
Twiddle one's thumb – rotate one's thumbs around each other... to do nothing

Today's mobile phones are constantly twiddling... awaiting calls or data to be passed!



Key Observations

- ❖ Today's smartphones are no longer just phones
- ❖ Just as powerful as regular PCs were a few years ago
 - ❖ 600 MHz processors (--> 1 GHz)
 - ❖ 512 MB of RAM
 - ❖ More than 8GB of storage
 - ❖ With...
 - Wireless network: 2.5/3G, WiFi, Bluetooth
 - Content capture – photo, video, sound





Content Sharing

- ❖ Capturing images on the go
 - ❖ Pre-equipped to capture images, video, sound and text
- ❖ Sharing is cumbersome
 - ❖ email or MMS (Multimedia Messaging)
 - Time consuming
 - Waste resources
 - ❖ Portals (Flickr, YouTube, Facebook, etc.)
 - Extra steps
 - Under someone else's control
 - Inform recipients



What is TwiddleNet?

- ❖ Exploits smartphone-based network
 - ❖ Creates an autonomous network for personal mobile servers
 - ❖ Personal servers host user's content – images, videos, audio, and other real-time sensor data
 - ❖ Gateway that connects these personal servers within one network



Why TwiddleNet?

- ❖ Immediate content capture and dissemination
- ❖ Complete ownership of content
- ❖ Utilize full potential of mobile devices usually just waiting for data
- ❖ Provides access to data that is usually inaccessible



TwiddleNet + Smartphones

- ❖ Dual purpose:
 - ❖ Personal content server
 - Capture content → Tag it → Send alert
 - ❖ Content requester
 - Receive updates from the Portal
 - Request desired content from specific servers
- ❖ Smartphones can perform both modes simultaneously



Content Tagging

- ❖ TwiddleNet utilizes XML provisioning document to build tags
 - Mission number, type, location, date, etc.
- ❖ Tags are generated automatically
 - Option to manually provide additional information
- ❖ Tagging is important!
 - It tells who is the creator, when it was created, and any other pertinent descriptors

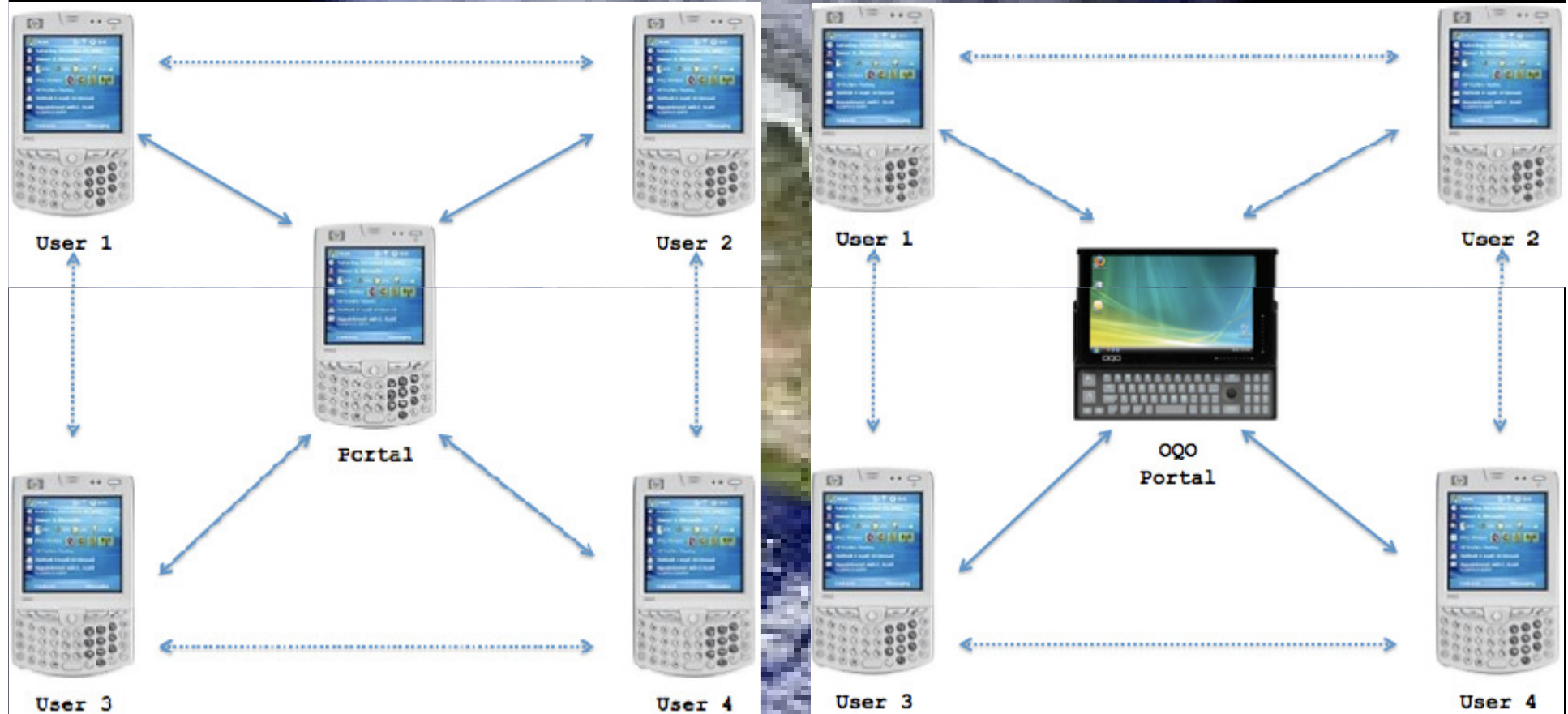


Content Dissemination

- ❖ Smartphones generate Atom feeds (much like RSS feeds only better)
- ❖ Feeds are generated as content is captured, or on a specified cycle
 - ❖ 5/10/15/30 minutes, etc.
- ❖ Sending feeds on a cycle helps to reduce battery consumption

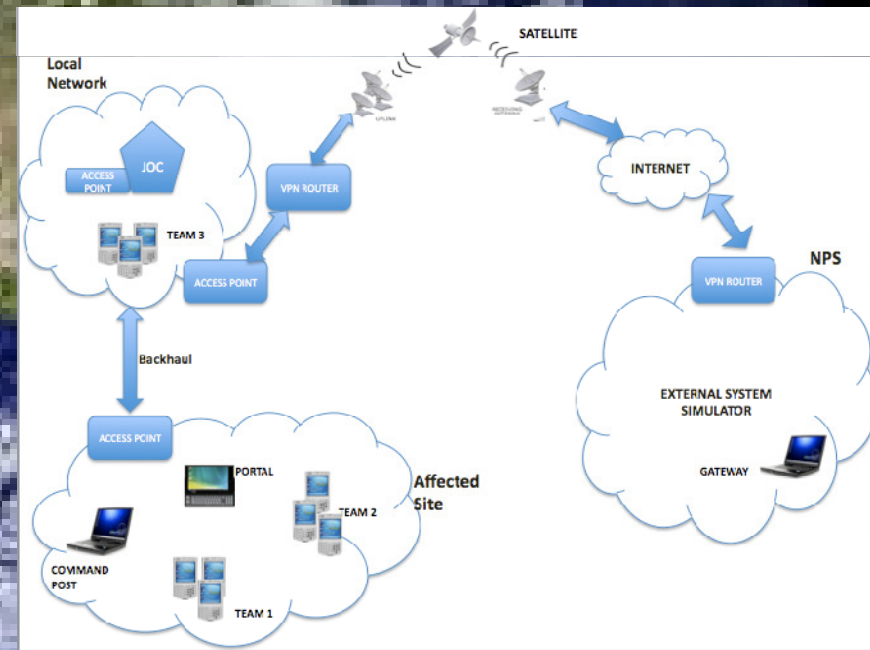
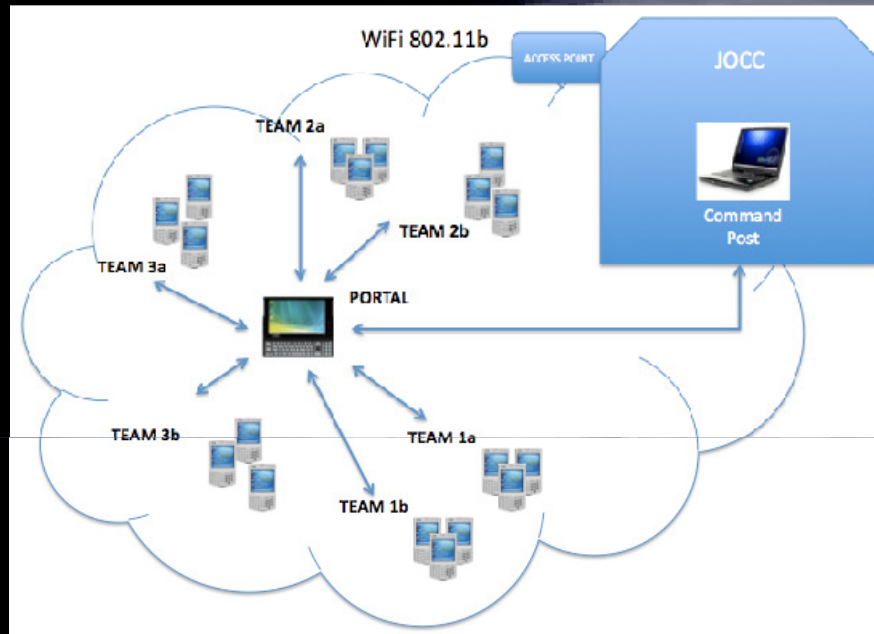


Basic Layout





Complex Layout





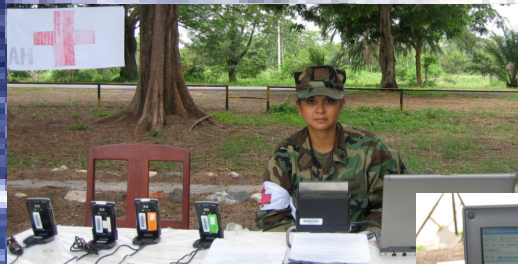
TwiddleNet Applications

- ❖ First Responder
 - ❖ Instantaneous capture/dissemination of tagged data utilizing any mobile WiFi network
- ❖ Unit Patrol/Urban Assault
- ❖ Social Networking
- ❖ Internet Based Advertising



Current Status

- ❖ Tested in COASTS Field Experiments
 - ❖ Camp Roberts, CA 2008/2009
 - ❖ Thailand 2008/2009
 - Incorporated in disaster relief scenarios





Summary

- ❖ Testing successful!
 - ❖ Reference: *Information Sharing for Medical Triage Tasking During Mass Casualty/Humanitarian Operations* – LCDR Lillian Abuan, US Navy
 - Includes Pros/Cons all iterations
- ❖ Fifth Generation TwiddleNet
 - ❖ Network Linking
 - Expand TwiddleNet architecture for use in a multi-network environment



Questions?

